APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,227	09/20/2005	Peter Graham Richardson	05-769	7674

20306   7590   04/03/2009
MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

EXAMINER
LIU, HARRY K

ART UNIT	PAPER NUMBER
3662	

MAIL DATE	DELIVERY MODE
04/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 January 2009</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-30</u> is/are pending in the application.
    4a) Of the above claim(s) <u>15-27 and 30</u> is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-14, 28-29</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
        1.☐ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of group II in filed 10550227 is acknowledged.

Claims **15-27, 30** are withdrawn from further consideration by the examiner, 37

CFR 1.142(b) as being drawn to a non-elected invention.

Election was made **with traverse** filed on 1/22/2009.

Response to Arguments (on Restriction Requirement)

Applicant argues that the restriction must be based on "Unity of Invention" since

the immediate case is in a PCT national stage and the use of MPEP 806.05(d) is not

pertinent to "Unity of Invention".

First of all, "Unity of Invention" refers to claims which shares common features

can be regarded as distinct inventions **does not mean** <u>as long as one common feature</u>

found in each group is considered **unity**. Feature(s) found in each group which result in

distinct and exclusive characteristic is considered lack of unity and therefore should be

restricted. MPEP 806.05(d) points to subcombinations which stems from common

feature to start with and then one or more unique feature differentiate the invention

results in **lack on unity.** The concept of MPEP 806.05(d) is consistent to "Unity of

Invention" found in 1893.03(d) and 18.19.

The following is a summary of **special technical feature**(s) found in **each invention**:

1.   Group I (claims 15-22 and 26-27 and 30), **rejecting unwanted signal** with a space-time processor.

2.   Group II (claims 1-14, 28-29), a **summer** is used to generate a beamformed output signals.

3.   Group III (claims 23-25), **covariance matrix,** forming the **adaptive weight vector** from a **column of the inverse** of the covariance matrix.

In the immediate application, claim 15 uses the space-time processor to reject unwanted signal components (lines 5-6) which implies <u>a device</u> is **rejecting unwanted signal** on top of space-time processing while claim 1 is silent to rejecting unwanted signal at the same stage which may occurs in later stages in the processing. Furthermore, claim 1 claims a **summer** used to generate a beamformed output signal from the delayed signals or from signals derived from the delayed signals. While generating a beamformed output signal by use of a summer is possible, it does not rule out the **use of other device** in claim 15 (method claim) which leads to distinct invention.

The requirement is still deemed proper and is therefore made **FINAL**.

Claim Rejections - 35 USC § 103

4   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5   Claims 1-14, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Maalouf (2002/0122002) in view of Zatman (ASAP 97, MIT Lincoln Lab).

Regarding claim 1, Maalouf discloses

- a time delay (see paragraph 0017 and FIG.1 below) beamformer (paragraph

0011) comprising a plurality of spaced apart input channels (antenna elements 160),

each channel having associated sampler (paragraph 0014);

- a processor (article 170) receives input signals and sampled signals to generate

space-time processed signals (FIG. 1 below, to reduce interference or reject

unwanted signal components);

- steering time delay (paragraph 0017) and summation means to generate

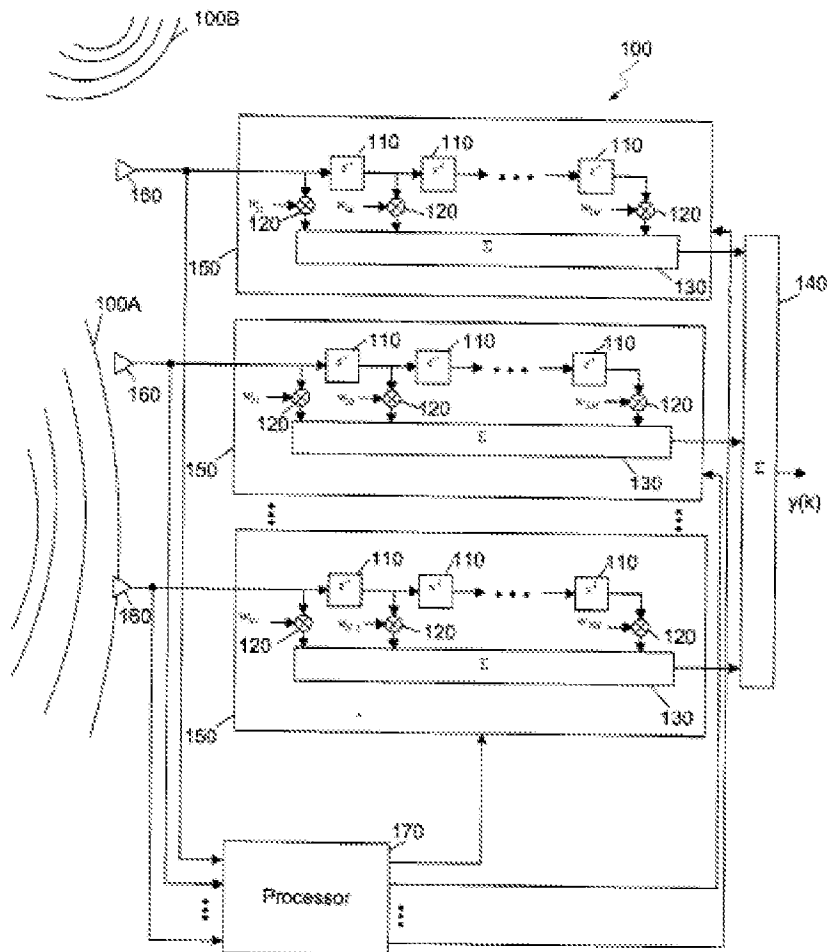beamformed output (see article 140 in FIG. 1).

Fig. 1

Maalouf does not specifically disclose a processor to generate space-time

signals or steering time delay to produce at least two delayed signals. However, Zatman

teaches a STAP (Space Time Adaptive Processing) to minimize both spatial and

Doppler dispersion on the main lobe. It would have been obvious to modify Maalouf with

Zatman with claimed feature in order to reduce dispersion.

Regarding claim 2, Maalouf discloses the processing means is arranged to output processed signals and the time delayed (article 110) signals are summed from a plurality of delayed signals.

Regarding claims 3-4, Maalouf discloses the processor produces as many processed signals and time delayed signals as the number of input signals (see 170 in FIG. 1 above). Note the figure shows corresponding numbers of inputs, processor outputs and time delayed signals.

Regarding claims 5, Maalouf discloses the covariance matrix is generated from input channel and sampled signals (Abstract and paragraph 0007). The covariance matrix is NxM matrix where N is the number of inputs and M is the tapped delay.

Regarding claims 6, Maalouf discloses applying steering vectors (w.sub.nm) to the matrix (paragraph 0017).

Regarding claims 7, Maalouf discloses the processing means is to determine filter coefficients (steering vectors) in generating time delayed signals.

Regarding claims 8, Maalouf discloses the time delay comprises time delay taps derived from input channels. The number of taps is based on based on sampling theorem which is about the pulse repetition interval.

Regarding claim 9, Maalouf discloses the time delay taps are derived from input channels (Abstract).

Regarding claim 10, Maalouf discloses the beamformer comprises N input channels and M time delay (paragraph 0038).

Regarding claim 11, Maalouf discloses the beamformer comprises nm time delay means and steered beam direction by building a matrix of nxm.

Regarding claim 12, Maalouf discloses the beamformer comprises a plurality of signal sensors (antenna elements) adapted to detect incident wave (GPS signals received) at different places (spatial characteristics of N elements). The tapped signals are fixed in time interval.

Regarding claim 13, Maalouf discloses the beamformer steering time delay applied by the steering time delay means to a particular channel are variable (adaptive) depending on the signals received by other channel.

Regarding claims 14, Maalouf discloses the beamformer processing is programmed (processor is program based) to apply adaptive weight to the signals of the input channels. An adaptive weight is applied based on (variable) other input channel signal received.

Regarding claim 28, Maalouf discloses all claim limitations in the rejection of claim 1 except for specifying beamformer used in radar application. However it is known that beamformer is famous for its application in radar field. It would have been obvious to use this beamformer in radar.

Regarding claim 29, Maalouf discloses the adaptive processing beamformer is a STAP (paragraph 0011) processor which is capable of producing beam direction simultaneously.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Liu whose telephone number is 571-270-1338. The examiner can normally be reached on Monday -Thursday and every other Friday..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-270-2338.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Harry Liu
Examiner
Art Unit 3662
April 3, 2009

/Thomas H. Tarcza/

Supervisory Patent Examiner, Art Unit 3662